

In the Claims

Please cancel claims 22-34 without prejudice and amend claims 1-3 and 5-21 as follows:

1. (Currently amended) Apparatus for oxygenating and pumping blood comprising:

a venous line a housing;

an arterial line;

a gas removal system coupled to the venous line, the gas removal system comprising a housing having a gas collection plenum and a gas removal port and a filter element disposed within ~~coupled to~~ the housing;

a blood oxygenation element having a blood outlet coupled to the arterial line disposed within the housing; and

a pump coupled in fluid communication with the blood oxygenation element, the pump coupled directly to the gas removal system to induce a negative pressure in the gas removal system and the venous line;

a sensor disposed on the gas collection plenum to monitor a level of gas or blood in the gas collection plenum;

a suction line coupled to the gas removal port;

a valve operatively associated with the suction line;

a microprocessor-based controller coupled to the sensor to continuously monitor the level of gas or blood in the gas collection plenum, the controller programmed to selectively actuate the valve to remove gas accumulated in the gas collection plenum; and

a control panel coupled to the controller, the control panel configured to accept input commands that control operation of the gas removal system.

2. (Currently amended) The apparatus of claim 1 wherein the gas removal system comprises an ultrasonic sensor +
~~a sensor that detects the presence of gas within the housing and outputs a signal; and~~
~~a controller that controls operation of the apparatus responsive to the signal.~~

3. (Currently amended) The apparatus of claim 1 2 wherein the gas removal system further comprises a capacitive element +

~~a line adapted to be coupled to a suction source; and~~
~~a valve coupled to the line between the housing and the suction source, wherein the valve is operated responsive to the controller.~~

4. (Original) The apparatus of claim 1 wherein the blood oxygenation element comprises an annular fiber bundle.

5. (Currently amended) The apparatus of claim 1 4 wherein the gas removal system, blood oxygenation element and pump are coupled together in a fixed, predetermined arrangement
~~the housing includes a central void and the annular fiber bundle is disposed surrounding the central void.~~

6. (Currently amended) The apparatus of claim 1 5 further comprising at least a first pole-mounted support arm for supporting the gas removal system, the blood oxygenation element and the pump ~~wherein the gas removal system further comprises a filter element disposed at least partially in the central void.~~

7. (Currently amended) The apparatus of claim 1 & wherein the filter element ~~further~~ comprises a first stage of a multi-stage blood filter at least one baffle.

8. (Currently amended) The apparatus of claim 6 & ~~further comprising at least a second pole-mounted support arm for supporting the control panel wherein the gas removal system further comprises a filter element disposed at an inlet to the central void, the filter element comprising a pleated material.~~

9. (Currently amended) The apparatus of claim 1 ~~further comprising a recirculation line coupled between blood outlet and the gas removal system wherein the housing includes a blood inlet manifold and a blood outlet manifold, and the blood inlet manifold is disposed on a diametrically opposite side of the housing from the blood outlet manifold.~~

10. (Currently amended) The apparatus of claim 1 & wherein the pump comprises an impeller that is magnetically coupled to a reusable drive unit ~~is disposed within the housing.~~

11. (Currently amended) The apparatus of claim 1, ~~further comprising a heat exchanger coupled between the venous line and the arterial line mounted to the housing.~~

12. (Currently amended) Apparatus for oxygenating and pumping blood comprising:

a venous line;
an arterial line; and
a blood circuit coupled between the venous line and the arterial line, the blood circuit comprising a gas removal

system, a pump and an oxygenator coupled together in a fixed, predetermined arrangement, housing,

a blood oxygenation element having an annular fiber bundle disposed within the housing surrounding a central void, the blood oxygenation element having an inlet and an outlet, the inlet being disposed on a diametrically opposite side of the annular fiber bundle from the outlet; and

a pump coupled in fluid communication with the blood oxygenation element, the pump having a pump inlet and a pump outlet coupled to the inlet

wherein the pump is coupled in fluid communication between the oxygenator and the gas removal system to induce a negative pressure in the gas removal system and the venous line; and

wherein the gas removal system is coupled to the venous line and comprises:

a housing having a gas collection plenum and a gas removal port,

a sensor disposed on the housing to monitor a level of gas or blood in the gas collection plenum;

a suction line coupled to the gas removal port;

a valve operatively associated with the suction line;

a microprocessor-based controller coupled to the sensor to continuously monitor the level of gas or blood in the gas collection plenum, the controller programmed to selectively actuate the valve to remove gas accumulated in the gas collection plenum; and

a control panel coupled to the controller, the control panel configured to accept input commands that control operation of the gas removal system.

13. (Currently amended) The apparatus of claim 12 wherein the sensor employs ultrasonic energy housing includes an inlet manifold and an outlet manifold, the inlet manifold extending along a first side of the housing and the outlet manifold extending along a diametrically opposite side of the housing.

14. (Currently amended) The apparatus of claim 13 further comprising at least a first pole-mounted support arm for supporting the blood circuit wherein the housing further includes a relief area on an interior wall of the housing opposite to at least one of the inlet manifold and the outlet manifold.

15. (Currently amended) The apparatus of claim 12 further comprises at least a second pole-mounted support arm for supporting the control panel wherein the pump is mounted within the housing below the blood oxygenation element.

16. (Currently amended) The apparatus of claim 12, wherein the further comprising a gas removal system further comprises a filter element disposed within the housing.

17. (Currently amended) The apparatus of claim 16 wherein the filter element comprises a first stage of a multi-stage blood filter the gas removal system comprises: a sensor that detects the presence of gas within the housing and outputs a signal; and a controller that controls operation of the apparatus responsive to the signal.

18. (Currently amended) The apparatus of claim 12 17 further comprising a recirculation line coupled between the oxygenator and the gas removal system wherein the gas removal

~~system further comprises: a line adapted to be coupled to a suction source; and a valve coupled to the line between the housing and the suction source, wherein the valve is operated responsive to the controller.~~

19. (Currently amended) The apparatus of claim 16 wherein the pump comprises an impeller that is magnetically coupled to a reusable drive unit gas removal system further comprises a filter element disposed at least partially in the central void.

20. (Currently amended) The apparatus of claim 12 16 wherein the sensor comprises a capacitive element filter element further comprises at least one baffle.

21. (Currently amended) The apparatus of claim 12 16 further comprising a heat exchanger coupled between the venous line and the arterial line 16 wherein the gas removal system further comprises a filter element disposed at an inlet to the central void, the filter element comprising a pleated material.

22.-34. (Canceled).